UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte LAWRENCE J. FITZGERALD,
BRIAN E. WOODWORTH, WALTER F. KASPER,
JOHN R. ZERN, and KEN W. NIEDERST

Appeal 2008-4010
Application 11/072,833
Technology Center 1700

Decided: December 29, 2008

Before EDWARD C. KIMLIN, CHUNG K. PAK, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

PAK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's refusal to allow claims 1, 3, 5 through 17, 19, and 20, which are all of the claims pending in the above-identified application. Claim 19 was amended subsequent to the final rejection dated November 28, 2006. (*See*

Amendment dated May 14, 2007, entered on June 7, 2007). We have jurisdiction pursuant to 35 U.S.C. § 6.

We AFFIRM.

STATEMENT OF THE CASE

The subject matter on appeal is directed to a coated microporous sheet and its method of making. According to Appellants, the coated microporous sheet is made by applying a gas barrier coating composition, which has an oxygen permeability of less than 3 cm^3-mil/100$inches^2$/atmosphere/day, on a microporous sheet. (Spec. [0005], [0009]). Further details of the appealed subject matter are recited in claims 1, 3, 5, 11, 17, and 19, which are reproduced below:

1. A coated microporous sheet comprising:

a microporous sheet; and

a barrier coating comprising a polyurethane over at least a portion of the microporous sheet, wherein the barrier coating has an oxygen permeability of less than 3 cm^3-mil/100$inches^2$/atmosphere/day.

3. The coated microporous sheet of Claim 1, wherein the barrier coating has an oxygen permeability of less than 1 cm^3-mil/100$inches^2$/atmosphere/day[.]

5. The coated microporous sheet of Claim 1, wherein the polyurethane comprises at least 60 weight percent of *meta*-substituted aromatic material.

11. The coated microporous sheet of Claim 1, wherein the barrier coating further comprises high aspect ratio platelets.

17. A method of coating a microporous sheet, comprising applying a gas barrier coating composition on the microporous sheet, wherein the barrier coating comprises a polyurethane and has an oxygen permeability of less than 3 cm^3-mil/100$inches^2$/atmosphere/day.

19. The method of Claim 17, wherein the polyurethane comprises at least 30 weight percent of *meta*-substituted aromatic material.

As evidence of unpatentability of the claimed subject matter, the Examiner relies upon the following references:

Lustig	3,879,330	Apr. 22, 1975
Trumble	4,441,213	Apr. 10, 1984
Henn '316	4,532,316	Jul. 30, 1985
Leatherman	4,892,779	Jan. 9, 1990
Henn '985	4,961,985	Oct. 9, 1990
Dailey	5,036,551	Aug. 6, 1991
Kubota	5,204,379	Apr. 20, 1993
Takahashi	6,013,363	Jan. 11, 2000

As evidence of patentability of the claimed subject matter, Appellants rely on the following reference:

Salame, M. *Permeability of Plastics: Inherent Limitation or Not?* Problem Solving Plast., Nat.Assn.Corros.Eng. (1971), Figure 11 -- Oxygen and water permeability in various plastics (hereinafter "Salame").

The Examiner rejects the claims on appeal as follows[1]:

[1] The Examiner refers to U.S. Patent 4,405,727 issued to Brownescombe on September 20, 1983, at page 12 of the Answer. The Examiner, however, does not include this reference in the statement of rejection set forth in the Answer. *See* Ans. 12. Therefore, we will not consider this reference in determining the propriety of the Examiner's rejection. *See In re Hoch*, 428

1) Claims 1, 3, 13-17, and 20 under 35 U.S.C. § 102(b) as anticipated by the disclosure of Leatherman; or alternatively, under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Leatherman;

2) Claims 1 and 17 under 35 U.S.C. § 102(b) as anticipated by the disclosure of Dailey; or alternatively, under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Dailey;

3) Claims 1, 3, 13, and 14 under 35 U.S.C. § 102(b) as anticipated by the disclosure of Henn '985; or alternatively, under 35 U.S.C. § 103(a) as unpatentable over the disclosure of Henn '985;

4) Claims 5-7, and 19 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103 (a) as unpatentable over the disclosure of Dailey as evidenced by the disclosure of Kubota;

5) Claims 1, 8-10, 12, and 17 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Takahashi and Lustig; and

6) Claim 11 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Dailey and Trumble.

Appellants appeal from the Examiner's decision rejecting the claims on appeal under 35 U.S.C. §§ 102(b) and 103(a).

ISSUES

With respect to rejections (1) through (3) and (6), Appellants do not dispute the Examiner's determination that Leatherman, Dailey, and Henn

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F.2d 1341, 1342 n.3 (CCPA 1970) ("[W]here a reference is relied on to support a rejection, whether or not in 'a minor capacity,' there would appear to be no excuse for not positively including that reference in the statement of the rejection.").

‘985 individually teach a method of coating a microporous sheet by applying a polyurethane gas barrier coating and a coated microporous sheet having a microporous sheet and a polyurethane barrier coating over at least a portion of the microporous sheet. (*Compare* Ans. 3-8 *with* App. Br. 3-13 and Reply Br. 2-7; *see* FF 7-16 below). Appellants contend that neither Leatherman, Dailey, nor Henn ‘985 teaches or would have suggested a barrier coating having an oxygen permeability of less than 3 cm^3-mil/100$inches^2$/atmosphere/day" as required by claims 1 and 17 and/or an "oxygen permeability of less than 1 cm^3-mil/100$inches^2$/atmosphere/day" as required by claim 3 (App. Br. 3-10 and Reply Br. 2-7). Appellants also rely on Salame to show that not all polyurethane coatings necessarily possess the claimed oxygen permeability and are suitable as oxygen barrier layers. *Id*. According to Appellants, this showing demonstrates that the polyurethane gas barrier coatings taught by Leatherman, Dailey, and Henn ‘985 do not necessarily possess the claimed oxygen permeability and would not have led one of ordinary skill in the art to employ their polyurethane gas barrier coatings as oxygen barrier layers. *Id*. Hence, it is Appellants’ view that the Examiner’s §§ 102 and 103 rejections are in error. *Id*.

Therefore, the first issue is: Have Appellants shown reversible error in the Examiner's determination that Leatherman, Dailey, and Henn ‘985 individually teaches or would have suggested a barrier coating having an "oxygen permeability of less than 3 cm^3-mil/100$inches^2$/atmosphere/day" as required by claims 1 and 17 and/or an "oxygen permeability of less than 1 cm^3-mil/100$inches^2$/atmosphere/day" as required by claim 3 within the meaning of §§ 102 and 103? If no error is identified in the Examiner’s

prima facie cases of anticipation and obviousness, have Appellants demonstrated that their rebuttal evidence overcomes the prima facie cases established by the Examiner?

With respect to rejection (4), the Examiner contends that Dailey, as evidenced by Kubota, teaches or would have suggested the claimed amount of the *meta*-substituted aromatic material as required by claims 5 and 19. (Ans. 8-9 and 20-22). Appellants, on the other hand, argue that Dailey, as evidenced by Kubota, does not teach, nor would have suggested the claimed amount of the *meta*-substituted aromatic material required by claims 5 and 19. (App. Br. 11-12 and Reply Br. 5-6).

Therefore, the second issue is: Has the Examiner demonstrated that Dailey, as evidenced by Kubota, teaches or would have suggested the claimed amount of the *meta*-substituted aromatic material required by claims 5 and 19?

With respect to rejection (5), Appellants contend that “one skilled in the art would not use the polymer compositions of Lustig to achieve [the] low oxygen permeability [required by claims 1 and 17].” (App. Br. 12-13 and Reply Br. 6-7). The Examiner, on the other hand, determines that Takahashi and Lustig would have suggested the claimed oxygen permeability required by claims 1 and 17. (Ans. 10-12).

Therefore, the third issue is: Have Appellants shown reversible error in the Examiner's determination that Takahashi and Lustig teach or would have suggested a barrier coating having an "oxygen permeability of less than 3 cm^3-mil/100$inches^2$/atmosphere/day" as recited in claims 1 and 17?

RELEVANT FINDINGS OF FACT (FF)

1. The Specification at ¶ [0038] defines microporous sheet as "comprising a polymer matrix, an interconnecting network of pores and, optionally, filler particles."
2. The Specification at ¶ [0008] defines barrier coating as "a coating that imparts vapor barrier, gas barrier and/or chemical barrier to a substrate."
3. The Specification at ¶ [0008] defines vapor barrier as "a barrier and/or low permeability to liquid and/or its vapor."
4. The Specification at ¶ [0008] defines gas barrier as "a barrier and/or low permeability to oxygen, nitrogen, carbon dioxide and other gases."
5. The Specification at ¶ [0008] defines a chemical barrier as "a barrier and/or low permeability to the migration of a molecule from one substrate to another, and/or from within one substrate to its surface."
6. The barrier layer exemplified includes, *inter alia*, polyurethanes, poly(meth)acrylates, polyvinyl ethers, polyvinyl alcohols, polyvinylidene chlorides epoxy amines, and the like made from any known method. (Spec. ¶ [0012]-[0016]). In one embodiment, the barrier coating comprises at least 30 weight percent of *meta*-substituted aromatic material, which includes m-tetramethylxylyene diisocyanate. (Spec. ¶¶ [0012], [0016], and [0022])
7. Leatherman at col. 1, ll. 16-19 states that "one embodiment of the invention is a multilayer article comprising material which is impervious to the passage of gas and bacteria fusion bonded in the

absence of extrinsic intervening adhesive to [a] microporous material . . ."

8. Leatherman at col. 12, ll. 52-56 states that a "microporous material is fusion bonded to at least one layer of substantially nonporous material in the absence of extrinsic intervening adhesive. Substantially nonporous materials are those which are generally impervious to the passage of liquids, gases, and bacteria."
9. Leatherman at col. 12, l. 61 to col. 13, l. 36 states that suitable nonporous materials include, *inter alia*, a thermoplastic sheet or film made from elastomeric polyurethane
10. Leatherman at col. 14, ll. 43-48 states that "[t]he multilayer articles of the present invention have many and varied uses including gaskets, cushion assemblies, signs, printing substrates, substrates for pen and ink drawings, maps (particularly maritime maps), book covers, book pages, wall coverings, and seams, joints, and seals of breathable packages."
11. Dailey teaches at col. 5, ll. 45-50 an elastomeric composite fabric comprising a microporous polymeric membrane 1, a continuous moisture permeable polymer 2, and an elastomeric nonwoven web material 3.
12. Dailey teaches at col. 9, ll. 60-67 that the continuous moisture permeable polymer may be composed of, *inter alia*, a polyurethane.
13. Dailey at col. 7, ll. 9-19 states:

> Having a continuous water vapor-permeable but liquid water impermeable polymer layer, the elastomeric composite fabric provides a barrier to particle migration

and other contaminants. This provides superior contamination protection over material that relies on filtration phenomena to keep out (or in) contaminants. The continuity of this layer can be demonstrated by the fact that the elastomeric composite fabric has substantially no air permeability. This property is imparted by the continuity of the polymer layer, because the nonwoven substrate and the microporous membrane exhibit air flow by their nature.

14. Dailey at col. 9, ll. 40-44 states "[t]he continuous water vapor permeable polymer layer is an hydrophilic polymer having some elastomeric characteristics. The hydrophilic layer selectively transports water by diffusion, but does not support pressure driven liquid or air flow."

15. Dailey at col. 11, ll. 39-51 teaches that polyurethane also functions as an adhesive that bonds the microporous membrane and the elastomeric nonwoven.

16. Dailey at col. 10, ll. 50-51 teaches polyurethanes from Henn '316 can be used.

17. Henn ‘985 teaches at col. 2, ll. 24-27 a coated fabric having a porous scaffold material, a hydrophilic polyurethane resin, and a substrate.

18. Henn ‘985 at col. 4, ll. 3-7 that "[t]he hydrophilic polyurethane layer selectively transports water by diffusion but does not support pressure driven liquid flow. Therefore moisture is transported, but the continuous layer precludes passage of microorganisms and air."

19. Henn '316 at col. 5, ll. 20-48 teaches the formation of a polyurethane adhesive by reacting the following:

(i) a polyol (A) having a number average molecular weight of from about 600 to about 3500 and having a functionality of at least 2;
(ii) an isocyanate (B) having a functionality of at least 2; and

(iii) a low molecular weight chain extender (C) having a molecular weight in a range lower than about 500 and having a functionality of at least 2, wherein the reactants are employed in such proportions so as to satisfy the following equations:

$$\frac{Eq_{NCO}}{Eq_{OH} + Eq_{CE}} \geq 1.1$$

$$Eq_{OH} \geq Eq_{CE}$$

$$Eq_{CE} > 0,$$

wherein Eq_{NCO} is the equivalent of the isocyanate species employed, and Eq_{OH} and Eq_{CE} denote the respective molar equivalents of the polyol and chain extender employed, the soft segments being provided by the polyol and the suitable hard segments being provided by the reaction product of the isocyanate and chain extender and which induce phase-separation of the hard and soft segments in the prepolymer as a result of thermodynamic incompatibility between the hard and soft segments.

20. Henn '316 at col. 5, ll. 49-52 teaches that ingredient (i) may be selected from widely differing choices as "poly(alkylene ethers), polyesters, polycaprolactones, hydroxyl terminated polyester-amides, polycarbonates, polybutadienes or copolymers thereof." (col. 5, ll. 49-52).

21. Henn '316 at col. 12, l. 42 to col. 13, l. 4 further teaches that ingredient (ii) may be selected from:

> those exhibiting several or all of the following characteristics: bulk, symmetry around the isocyanate functional groups, rigid, aromatic, crystalline and high purity. By way of example, but not limited to, are: 4,4'-diphenylmethane diisocyanate, cyclohexanediisocyanate, p-phenylene diisocyanate, 1,5-napthalene diisocyanate, toluene diisocyanate, p-xylene diisocyanate, hexamethylene diisocyanate, 4,4'-dicyclohexylmethane diisocyanate, 4-bis(isocyanamethyl)cyclohexane, p-tetramethylxylene diisocyanate, m-tetramethylxylene diisocyanate or the like. The

> organic diisocyanates (B) may be employed singularly or in admixture with each other.

22. Henn '316 at col. 13, ll. 15-37 teaches that ingredient (iii) may be selected from:

> (i) glycols of aromatic, open chain aliphatic, cycloaliphatic and combinations thereof,
> (ii) aromatic diamines,
> (iii) alkanolamines and hydroxy acylamines, and
> (iv) it is further contempla[t]ed that open chain aliphatic and cycloaliphatic diamines are satisfactory given an appropriate synthesis procedure.
>
> By way of example, but not limited to, are: 1,4-butane glycol, 1,6-hexane glycol, hydroquinone di(-hydroxyethyl)ether, bis(hydroxyethyl)bisphenol A, bis(2-hydroxypropyl)bisphenol A, bis(2-hydroxypropyl)isophthalate, bis(2-hydroxyethyl)carbamate, 1,2-bis(2-aminophenylthio)ethane, trimethylene glycol di-p-aminobenzoate, resorcinol di(-hydroxyethyl)ether, 1,4-cyclohexane dimethanol, 4,4'-dihydroxy diphenyl sulfone, 4,4'-methylene bis(o-chloroaniline), phenylene diamine, methylene bis(aniline), ethanolamine, N,N'-(bis-2-hydroxyethyl)dimethylhydantoin, ethylene diamine, butane diamine, and the like. The low molecular weight bifunctional chain extenders (C) may be used singly or in admixture with each other.

23. Kubota at col. 2, ll. 22-38 states:

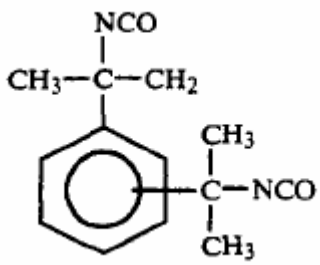
> It is a further object of the invention to provide a method of producing laminated articles wherein substrates are laminated together at a low nip temperature and yet have a large initial adhesive strength therebetween, thereby to provide laminated articles which can be further processed, for instance, creased, scored or folded into boxes, or can be used to wrap or envelope articles immediately after the lamination.
>
> In accordance with the invention, there is provided a photocurable adhesive which comprises:

(a) a polyurethene poly(meth)acrylate having a poly-urethane structure which contains α, α, α', α'-tetramethylxylylenediisocyanate as a main polyisocyanate component; and

(b) an adhesive coupling agent in an amount of 0.05-10 parts by weight in relation to 100 parts by weight of the polyurethene [sic, polyurethane] poly(meth)acrylate.

24. Kubota at col. 3, ll. 11-32 states:

The TMXDI is represented by



and has meta-, para- and ortho-isomers. Usually a mix-ester composed of a major portion of meta-isomer and a minor portion of para-isomer is commercially available. However, a mixture containing the ortho-isomer may also be used.

In accordance with the invention, the poly-urethane structure in the polyurethane poly(meth) acrylate preferably contains TMXDI in an amount of not less than 60% by weight based on the whole isocyanate component in the polyurethane structure, and more preferably in an amount of not less than 80% by weight. It is most preferred, however, that the whole polyisocyanate component in the polyurethane structure in the polyurethane poly(meth)acrylate is substantially composed of TMXDI.

25. Kubota at col. 4, ll. 60-65 teaches that TDMXI functions to enhance to coatability of the adhesive by reducing the viscosity of the polyurethane structure.

26. Takahashi at col. 1, ll. 4-7 states that "[t]he present invention relates to packaging material suitable for packaging powdery materials such as tea, bath salts, coffee beans, drugs, agricultural chemicals, candies and fertilizers, and liquids such as sake and fruit juice."

27. Takahashi at col. 2, ll. 25-35 states:

> Referring to the figures, the reference character I designates a stretched microporous resin film base layer, the reference character Ia designates a heat sealable adhesive resin layer, the reference character Ib designates an adhesive layer provided if necessary, the reference character II designates a gas barrier resin film layer, the reference character III designates an inorganic oxide thin film layer, the reference character IV designates a heat sealable adhesive resin layer, and the reference character P designates a print.

28. Takahashi at col. 5, ll. 12-24 states:

> Gas Barrier Resin Film Layer (II):
> The gas barrier resins used herein have a water vapor permeability (JIS Z-0208) of 100 g/m^2·24 hr or less, preferably 50 g/m^2·24 hr or less, and an oxygen permeability (JIS Z-1707) of 300 cc/m^2·24 hr·atm or less, preferably 200 cc/m^2·24 hr·atm or less. Examples thereof include saturated polyesters such as polyethylene terephthalate, polyethylene-2,6-naphthalate, polyamides such as nylon 6, nylon 12 and nylon 66, aromatic polycarbonates, polyvinylidene chloride and ethylene-vinyl alcohol copolymers. As noted above, the water vapor permeability and the oxygen permeability refer to these values as measured by JIS Z-0208 and JIS Z-1707 respectively.

29. Lustig at col. 1, ll. 5-9 states that "[t]he invention relates to a food wrap, and more particularly, to a food wrap having a desirable balance of properties. The food wrap of the invention combines excellent oxygen barrier properties with good elastic properties."

30. Lustig at col. 1, ll. 25-36 states:

> The present invention is addressed to the preparation of an elastic food wrap that also has desirable oxygen barrier properties such that foods packaged therein can be stored for relatively long periods of time without excessive risk of spoilage and color change owing to exposure to atmospheric oxygen. . . .
>
> Another object of this invention is the provision of a food wrap composed of a vinylidene chloride polymer and a thermoplastic urethane polymer.

31. Lustig at col. 3, ll. 26-33 states:

> The proportions of thermoplastic urethane polymer and vinylidene polymer that are employed in the preparation of the food wrap films of the invention are selected so as to yield a film having good elastic properties as well as excellent oxygen barrier properties. The food wrap films of the invention have an oxygen permeability below about 30 cc.-mil/100 sq. in./24 hours/atmosphere, as determined by ASTM-1434-66 test procedure.

32. In one preferred embodiment, Lustig teaches at Table VII (col. 9, ll. 49-55) a polymer composed of 40 weight percent urethane and 60 weight percent vinylidene chloride having an oxygen permeability of 2.5 cc.-mil/100in.^{2}/atmosphere/day.

PRINCIPLES OF LAW

As our reviewing court stated in *In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997):

> A patent applicant is free to recite features of an apparatus either structurally or functionally. *See In re Swinehart*, 439 F.2d 210 (CCPA 1971) ("[T]here is nothing intrinsically wrong with [defining something by what it does rather than what it is] in drafting patent claims."). Yet, choosing to define an element functionally, i.e., by what it does, carries with it a risk. As our predecessor court stated in *Swinehart*, 439 F.2d at 213:
>
>> where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on.

When the claimed and prior art articles or apparatuses appear to be identical or substantially identical, the Examiner can require an applicant to prove that the prior art article or apparatus does not necessarily or inherently possess the functional characteristics of the claimed article or apparatus. *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1977).

Under 35 U.S.C. § 102, "every element of the claimed invention must be identically shown in a single reference . . ." *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). However, one must take into account the reference's incorporation by reference of another patent. *Ultradent v. Life-Like Cosmetics*, 127 F.3d. 1065, 1070-1073 (Fed. Cir. 1997). Moreover, "extrinsic evidence may be considered when it is used to explain, but not to expand, the meaning of a reference." *In re Baxter*, 952 F.2d 388, 390 (Fed. Cir. 1991). As stated by our reviewing court:

> It is sometimes appropriate to consider extrinsic evidence to explain the disclosure of a reference. Such factual elaboration is necessarily of limited scope and probative value, for a finding of anticipation requires that all aspects of the claimed invention were already described in a single reference: a finding that is not supportable if it is necessary to prove facts beyond those disclosed in the reference in order to meet the claim limitations. The role of extrinsic evidence is to educate the decision-maker to what the reference meant to persons of ordinary skill in the field of the invention, not to fill gaps in the reference. If it is necessary to reach beyond the boundaries of a single reference to provide missing disclosure of the claimed invention, the proper ground is not § 102 anticipation, but § 103 obviousness.

Scripps v. Genentech, 927 F.2d 1565, 1566-1567 (1991).

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). "[A]nalysis [of whether the subject matter of a claim would have been obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc*., 127 S. Ct. 1727, 1741 (2007). "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 127 S.Ct. at 1742, (*quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

A prior art disclosure of a chemical genus renders the claimed species within the genus prima facie obvious to one of ordinary skill in the art. *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989).

ANALYSES

Rejections (1) through (3)[2]

We begin by noting that the Specification defines a barrier coating as "a coating that imparts vapor barrier, **gas barrier** and/**or** chemical barrier to a substrate." (FF 2-5)(emphasis added). The Specification further defines a "gas barrier" as "a barrier and/**or low permeability to oxygen, nitrogen, carbon dioxide and other gases**." (FF 4)(emphasis added). In this regard, the Specification exemplifies polyurethane as a suitable barrier layer (FF 6).

Like Appellants, each of the applied prior art references in rejections (1) through (3) teaches a polyurethane barrier layer. (*Compare* FF 1-6 *with* FF 7-18). Leatherman teaches a polyurethane layer that is "generally impervious to . . . the passage of . . . gases"; Dailey teaches a polyurethane layer that has "substantially no air permeability"; and Henn '985 teaches a polyurethane layer that "precludes passage of microorganisms and air." (FF 8, 13, and 18). The air or gases taught by Leatherman, Dailey, or Henn are inclusive of oxygen, nitrogen, carbon dioxide, and other gases.

[2] Appellants base their arguments for patentability solely on the limitations of claims 1 and 17 for rejections (1) and (2) and claims 1 and 3 for rejection (3). Therefore, we select claims 1 and 17 for rejections (1) and (2) and claims 1 and 3 for rejection (3) as the representative claims consistent with 37 C.F.R. § 41.37(c)(1)(vii).

Therefore, it is reasonable to believe that Leatherman's, Dailey's, and Henn '985's polyurethane gas or air barrier layers are capable of performing the claimed functions, i.e., the claimed low oxygen permeability, within the meaning of 35 U.S.C § 102.

Even were we to determine that Leatherman's, Dailey's, or Henn '985's polyurethane gas or air barrier layer does not possesses an oxygen permeability of less than 3 cm^3-mil/100$inches^2$/atmosphere/day" as required by claims 1 and 17 and/or an "oxygen permeability of less than 1 cm^3-mil/100$inches^2$/atmosphere/day" as required by claim 3, the outcome of our decision remains unchanged. As stated above, Leatherman, Dailey, and Henn '985 would have at least suggested polyurethane layers having little to no air or gas permeability, which is inclusive of the claimed low oxygen permeability. (FF 8, 13, and 18).

Thus, we determine that Leatherman, Dailey, and Henn '985 individually would have at least suggested employing polyurethane layers having the claimed oxygen permeability within the meaning of 35 U.S.C. § 103.

To rebut the prima facie case under §§ 102 and 103 established by the Examiner, Appellants allege that Salame's data show that the polyurethane coatings taught by Leatherman, Dailey, and Henn '985 (1) do not necessarily possess the claimed oxygen permeability within the meaning of § 102 and (2) would not have led one of ordinary skill in the art to employ them as oxygen barrier layers within the meaning of § 103. (App. Br. 6-7 and Reply Br. 6-7). We disagree.

Salame's data show, *inter alia*, that a certain, specific polyurethane has an oxygen permeability of 30 cm^3-mil/100$inches^2$/atmosphere/day. Salame's data, however, fail to show that Leatherman's, Dailey's, or Henn '985's particular polyurethane layer, which has little or no gas or air permeability, does not possess the claimed low oxygen permeability or that Leatherman, Dailey, or Henn '985 would not have suggested employing a polyurethane layer having little or no gas or air permeability, which is inclusive of the claimed low oxygen permeability. At best, Salame's data show that **one particular** polyurethane layer, which is unsuitable as an oxygen barrier, does not necessarily possess the claimed low oxygen permeability.

On this record, Appellants have not directed us to any persuasive arguments or evidence explaining why Salame's data relating to a single polyurethane layer, which is unsuitable as an oxygen barrier, show that Leatherman's, Dailey's, or Henn '985's polyurethane **gas or air barrier** layer does not necessarily possess the claimed low oxygen permeability or that Leatherman, Dailey, or Henn '985 would not have suggested employing a polyurethane layer having the claimed low oxygen permeability.

Accordingly, based on the Factual Findings set forth in the Answer and above, we affirm the Examiner's decision rejecting claims 1, 3, 13-17, and 20 under 35 U.S.C. §§ 102(b) and 103(a); claims 1 and 17 under 35 U.S.C. §§ 102(b) and 103(a); and claims 1, 3, 13, and 14 under 35 U.S.C. §§ 102(b) and 103(a).

Rejection (4)[3]

With respect to the § 102 rejection, the Examiner admits that Dailey does not disclose the claimed amount of *meta*-substituted aromatic material and relies on Kubota to show that "it is well known in the polyurethane art to use m-tetramethylxylyene diisocyanate (TMXDI) in the amount of not less than 60% by weight." (Ans. 9; *see* FF 6). Rather than rely upon Kubota to explain or define what was already described or present in Dailey, the Examiner relies upon Kobuta to provide an additional teaching missing in Dailey to arrive at the claimed invention, (i.e., the claimed amount of *meta*-substituted aromatic material). In other words, the Examiner uses extrinsic evidence to expand the teachings of Dailey.

Thus, we find that the Examiner's § 102 rejection is in error.

The § 103 rejection is, however, on a different footing since it is entirely proper under § 103 to use more than one reference to arrive at the claimed invention. Dailey teaches employing a polyurethane or poly(meth)acrylate to function as an adhesive and as an oxygen barrier layer having little or no air permeability. (FF 12-15). Dailey also teaches that polyurethanes from Henn '316 can be used. (FF 12-16).

Henn '316 teaches the formation of a polyurethane, which functions as an adhesive, by reacting ingredients including m-tetramethylxyl[y]ene diisocyanate, which is the same *meta*-substituted aromatic material as Appellants'. (FF 6, 19, and 21).

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[3] Appellants base their arguments for patentability solely on the limitations of claims 5 and 19. Therefore, we select claims 5 and 19 as the representative claims consistent with 37 C.F.R. § 41.37(c)(1)(vii).

Although Dailey, which incorporates by reference Henn '316 for the teaching of the claimed *meta*-substituted aromatic material, does not explicitly teach the claimed weight percent of the *meta*-substituted aromatic material, Kubota teaches employing a polyurethane having no less than 60% by weight of a m-tetramethylxylyene diisocyanate, in order to improve the polyurethane's coatability by reducing its viscosity. (FF 23-25).

Given that the *meta*-substituted aromatic material was known to be useful as the polyurethane gas or air barrier layer having desired adhesivity, we agree with the Examiner's determination that one of ordinary skill in the art would have been led to employ the claimed amount of the *meta*-substituted aromatic material in Dailey's polyurethane with a reasonable expectation of improving its coatability.

Accordingly, based on the Factual Findings set forth in the Answer and above, we affirm the Examiner's decision rejecting claims 5-7, and 19 under 35 U.S.C. § 103(a).

Rejection (5)[4]

Takahashi teaches a gas barrier layer of polyvinylidene chloride having, *inter alia*, a preferred oxygen permeability of "200 cm^3-mil/100$inches^2$/atmosphere/day **or less**" in packaging materials such as candies, coffee beans, and liquids such as sake and fruit juice. (FF 26-28)(emphasis added).

[4] Appellants base their arguments for patentability solely on the limitations of claims 1 and 17. Therefore, we select claims 1 and 17 as the representative claims consistent with 37 C.F.R. § 41.37(c)(1)(vii).

Lustig, like Takahashi, teaches a packaging material having low oxygen permeability. (FF 29-31). Lustig teaches a food wrap comprising a urethane and a vinylidene chloride to form a polymer that has an oxygen permeability "**below about** 30 cc.[cm^3]-mil/100inches^2/atmosphere/day." (FF 23-25)(emphasis added). In one preferred embodiment, Lustig teaches at Table VII a polymer composed of 40 weight percent urethane and 60 weight percent vinylidene chloride having an oxygen permeability of 2.5 cc.[cm^3]-mil/100inches^2/atmosphere/day. (FF 32).

Thus, we agree with the Examiner that one of ordinary skill in the art would have been led to employ the claimed low oxygen permeability layer taught or suggested by Lustig as Takahashi's gas barrier layer with a reasonable expectation of successfully packaging food items.

Accordingly, based on the Factual Findings set forth in the Answer and above, we affirm the Examiner's decision rejecting claims 1, 8-10, 12, and 17 under 35 U.S.C. § 103(a).

Rejection (6)

Appellants do not dispute the Examiner's determination that it would have been obvious to employ the features recited in dependent claim 11. *Compare* Ans. 12 *with* App. Br. 13 and Reply Br. 5-6. Rather, Appellants repeat the same arguments directed to independent claim 1. (App. Br. 8-9 and Reply Br. 8).

Thus, based on the same Factual Findings and conclusions set forth above, we concur with the Examiner that Dailey and Trumble would have

rendered the subject matter recited in claim 11 obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103(a).

Accordingly, based on the Factual Findings set forth in the Answer and above, we affirm the Examiner's decision rejecting claim 11 under 35 U.S.C. § 103(a).

ORDER

In summary:

1. The §§ 102(b) and 103(a) rejections of claims 1, 3, 13-17, and 20 are affirmed;
2. The §§ 102(b) and 103(a) rejections of claims 1 and 17 are affirmed;
3. The §§ 102(b) and 103(a) rejections of claims 1, 3, 13, and 14 are affirmed;
4. The § 102(b) rejection of claims 5-7, and 19 is reversed;
5. The § 103(a) rejection of claims 5-7, and 19 is affirmed;
6. The § 103(a) rejection of claims 1, 8-10, 12, and 17 is affirmed; and
7. The § 103(a) rejection of claim 11 is affirmed.

Accordingly, the decision of the Examiner is affirmed.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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